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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/617,033

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Taku Amada

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09/10/2004

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EXAMINER

PHAM, HAI CHI

ART UNIT

PAPER NUMBER

2861

DATE MAILED: 09/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/617,033

Applicant(s)

AMADA ET AL.

Examiner

Hai C Pham

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 31-35 is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-26, 29 and 30 is/are rejected.
- 7) ☒ Claim(s) 6, 27 and 28 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 10/10/03, 11/28/03, & (4) lists of related cases
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Specification*

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-2, 4-5, 7-11, 13-15, 18-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakajima et al. (U.S. 5,753,907).

Nakajima et al. discloses a multiple beam scanning apparatus comprising:

- an adjusting unit that adjusts the position of a light spot of said light beam formed on the scanned face, and a compensating unit that compensates the light intensity of said light beam at said scanned face due to change caused by the adjustment of the position of said light spot (col. 3, lines 16-40: the light intensity is compensated while the scanning line pitch is adjusted),
- wherein said light scanning apparatus scans said scanned face with a plurality of (N) light beams emitted by "N", light sources, said adjusting unit further comprises at least "N-1" deflecting units located between said light source and a

scanning unit, wherein each of the deflecting units deflects a corresponding one of the plurality of light beams in sub-scan directions and adjusts scan line pitch (Figs. 1b and 4: two semiconductor lasers 11 and 12 using a single beam composer 21 as a deflecting unit to adjust the scanning line pitch  $p$  at the scanned surface of the photosensitive drum),

- wherein said deflecting unit further comprises a semiconductor laser (11, 12) and a coupling lens (16, 17) combined with a holder (15) rotatable around an axis parallel to the optical axis of said coupling lens, the emission source of said semiconductor laser being eccentric to said optical axis (Fig. 1a)
- wherein said deflecting unit further comprises an aperture (27) combined with said holder that shapes said light beam, said aperture being eccentric to the light path of said light beam emitted by said semiconductor laser and passing through the center of said coupling lens (Fig. 1a),
- a detecting unit (photosensor 34) that detects the intensity of said light beam,
- wherein said compensating unit controls the radiation intensity of said light source (col. 3, lines 16-40),
- an aperture (27), provided between said light source and said scanning unit (Fig. 1a), that shapes said light beam, wherein said compensating unit displaces said aperture (by rotating the aperture 27),
- said compensating unit controls a transmissivity adjusting unit provided between said light source and said scanning unit (the aperture 27 adjusts the intensity of the light beam by rotation and thus blocks part of the light beam).

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The method claims 18 and 19 are deemed to be clearly anticipated by functions of the above structures.

4. Claims 21, 25-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Arimoto (U.S. 5,053,619).

Arimoto discloses a variable density scanning apparatus comprising that scans a scanned face with a plurality of (N) light beams (Fig. 12), comprising a plurality of adjusting units (beam path adjusters 211, 212, and diffraction grating 10), each of which adjusts the position of a scan line formed by a corresponding one of the plurality of light beams, wherein at least one of the plurality of adjusting units is a liquid crystal element (diffraction grating 10 being made of optical crystal) driven by an electric signal (using a high frequency signal).

Arimoto further teaches:

- said liquid crystal element being able to deflect said light beam by a micro angle (using a first-ordered diffracted beam),
- wherein at least "N-1" of the plurality of adjusting units are liquid crystal elements (N being 2, which represents the number of the semiconductor lasers).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3, 16-17, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakajima et al. In view of Andrews et al. (U.S. 5,493,326).

Nakajima et al. discloses all the basic limitations of the claimed invention except for the liquid crystal device using as a deflecting unit for further correcting the curvature of the scanning lines, and the tandem-type image forming apparatus.

Andrews et al. discloses an image forming apparatus comprising an optical component formed by liquid crystal disposed between the scanning unit (polygon mirror 16) and the photoconductor belt (2) for correcting a curvature or line skew of the scanning lines by applying a variable voltage across the optical component, which can be applied to a single or multiple ROS stations for producing a color image.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the liquid crystal device for correcting the scan line skew in the device of Nakajima et al. as taught by Andrews et al. The motivation for doing so would have been to prevent misregistration of the successive color scanning lines.

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakajima et al. in view of Hayashi et al. (U.S. 6,081,386).

Nakajima et al. discloses all the basic limitations of the claimed invention except for the resin lens provided in the optical path from said light source to said scanned face.

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Hayashi et al. teaches using a non-spherical scanning lens made of plastic, which would prevent the non-uniformity in the refraction index of the scanning lens to cause the variation of the scanning line pitch.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide a scanning lens made of resin as taught by Hayashi et al. in the device of Nakajima et al. The motivation for doing so would have been to suppress eventual variation of the scanning line pitch due to the non-uniformity of the refraction index of the scanning lens as suggested by Hayashi et al.

8. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto and Kanayama et al. (U.S. 5,047,789).

Arimoto discloses all the basic limitations of the claimed invention except for the memory unit that stores said electric signal driving said liquid crystal element.

Kanayama et al. discloses a driving circuit for driving a liquid crystal device based on data previously stored in a look-up table (40).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the look-up table as taught by Kanayama et al, in the device of Arimoto. The motivation for doing so would have been to provide a simplified driving circuit for accurately driving the liquid crystal device as suggested by Kanayama et al.

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9. Claims 29, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto in view of Andrews et al.

Arimoto discloses all the basic limitations of the claimed invention including the liquid crystal element (10) changing the pixel density in the sub-scan direction, but except for the tandem-type image forming apparatus.

Andrews et al. discloses an image forming apparatus comprising an optical component formed by liquid crystal disposed between the scanning unit (polygon mirror 16) and the photoconductor belt (2) for correcting a curvature or line skew of the scanning lines by applying a variable voltage across the optical component, which can be applied to a single or multiple ROS stations for producing a color image.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the tandem-type image forming apparatus in Arimoto since Andrews et al. teaches this to be known in the art to produce a color image using separate ROS system for each color.

#### ***Allowable Subject Matter***

10. Claims 31-35 are allowed.

11. Claims 6, 27 and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is an examiner's statement of reasons for allowance: the primary reason for the indication of the allowability of claim 6 is the inclusion therein, in



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combination as currently claimed, of the limitation "wherein said adjusting unit further comprises a liquid crystal deflecting element array having a plurality of liquid crystal deflecting elements arrayed in main-scan directions, each of which deflects said light beam in sub-scan directions, said liquid crystal deflecting element array being provided between said scanning unit and said scanned face", which is not found taught the prior art of record considered alone or in combination.

The primary reason for the indication of the allowability of claims 27 and 28 is the inclusion therein, in combination as currently claimed, of the limitation "wherein a maximum deflecting angle of each liquid crystal element is  $\pm 4.0$  (minute) or less", which is not found taught the prior art of record considered alone or in combination.

The primary reason for the indication of the allowability of claims 31 and 35 is the inclusion therein, in combination as currently claimed, of the limitation "wherein the ratio of a change in transmissivity (%) of said liquid crystal element caused by the deflection to a deflecting angle (minute) is equal to or smaller than 2.0 (%/minute)", which is not found taught the prior art of record considered alone or in combination.

Claims 32-34 are allowable because they are directly dependent from claim 31 above.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



HAI PHAM  
PRIMARY EXAMINER

September 3, 2004